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ON KINEMATICS OF SPICULES OF THE SOLAR CHROMOSPHERE

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ON KINEMATICS OF SPICULES OF THE SOLAR CHROMOSPHERE *

Comptes-Rendus
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Solar Physics,
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ABSTRACT.

New spectroscopic observations show that the matter of spicules ascends in the corona, but does not descend during the period when these objects are visible in H .

* * *

The evolution of spicules in time has been studied by taking a movie of the line H at the edge of the Sun, in regions near the solar equator. A 9 m spectrograph, installed at the Observatoite du Pic du Midi, was used to that effect. It provides for the considered region a dispersion of 3.6 mm/A [1]. The solar image as a diameter of about 20 cm.

The present study bears upon two series of observations that have been retained for their high quality.

1. - 27 August 1959 at 08 20 — 08 40 hrs UT. This sequence has been obtained by 13 spectroscopic scannings in succession at the same place on the Sun's eastern edge. These spectra describe

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* Sur la cinématique des spicules de la chromosphere solaire.
** Note presented by André Danjon.

the variations of the H_α chromosphere as a function of time and height (resolution in time : 1.5 m).

2.- On August 19, 1962 at 07 45 — 07 57 hrs UT. This sequence has been obtained by maintaining the Sun fixed with the aid of a photoelectric guiding so that the slot of the spectrograph remain at a constant distance from the eastern edge of the Sun. The rythm of one image every 8 seconds allows more precise measurements.

We have determined for every spicule the variation of radial velocities in the course of time and at the same height (4000 to 5000 km from the photosphere). For the purpose of this study well isolated spicules were retained : 10 on the first film, 21 on the second.

The Figure shows 12 examples of evolution of the radial velocity extracted from the second film; time T is expressed in abscissas in minutes and the radial velocities V_r are in the ordinates in kilometers per second.

For all the cases studied the evolution of velocities offers a common character: radial velocities do not change sign during lifetime of the individual. This would tend to demonstrate that the velocities of "descent", measured by S. L. Lippincott [2] on films by R. B. Dunn, are only apparent; the spicule ascends in the corona, which is translated by positive or negative radial velocities, depending upon the inclination of the trajectory relative to the line of aiming, but it does not descend, the object disappearing in H_α by ionization. If this hypothesis is correct, the velocity of descent provides the measure of the rapidity of the ionization of the spicular matter.

**** THE END ****

(Paris-Meudon Observatory)

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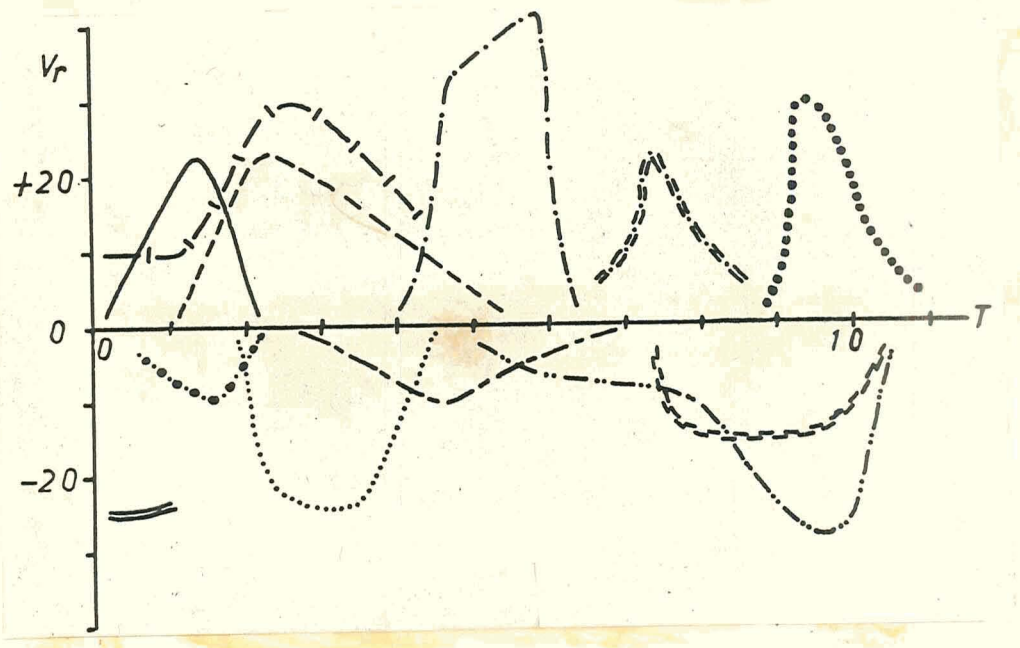

Fig.

Translated by ANDRE L. BRICHANT
for the
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on 5 February 1963

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